

PATENT COOPERATION TREATY

PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 23 May 2000 (23.05.00)	
International application No. PCT/US99/20308	Applicant's or agent's file reference
International filing date (day/month/year) 25 August 1999 (25.08.99)	Priority date (day/month/year) 27 August 1998 (27.08.98)
Applicant MESSING, Joachim et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

20 March 2000 (20.03.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer C. Cupello
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/20308

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : Please See Extra Sheet.

US CL : Please See Extra Sheet.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 435/69.1, 320.1, 410, 412, 419, 468; 536/23.6; 800/278, 287, 295, 298, 320.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WEST, Agricola, Biosis, Caplus, EMBL, Genseq, EST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KIRIHARA et al. Isolation And Sequence Of A Gene Encoding A Methionine-Rich 10-kDa Zein Protein From Maize. Gene. 1988, Vol. 71, pages 359-370, especially pages 360-363 and 366.	1-21
Y	CHAUDHURI et al. Allele-specific Parental Imprinting Of <i>dzr1</i> , A Posttranscriptional Regulator Of Zein Accumulation. Proc. Natl. Acad. Sci. USA. May 1994, Vol. 91, pages 4867-4871, especially pages 4868-4870.	1-18
Y	CRUZ-ALVAREZ et al. Post-transcriptional Regulation Of Methionine Content In Maize Kernels. Mol. Gen. Genet. 1991, Vol. 225, pages 331-339, especially pages 332, 335-336 and 338-339.	1-18

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
B earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

24 NOVEMBER 1999

Date of mailing of the international search report

07 DEC 1999

 Name and mailing address of the ISA/US
 Commissioner of Patents and Trademarks
 Box PCT
 Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

ASHWIN MEHTA

Telephone No. (703) 308-0196

INTERNATIONAL SEARCH REPORTInternational application No.
PCT/US99/20308**C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	SWARUP et al. Determinants Of The High-methionine Trait In Wild And Exotic Germplasm May Have Escaped Selection During Early Cultivation Of Maize. The Plant Journal. 1995, Vol. 8, No. 3, pages 359-368, especially pages 361-364.	1-18
Y	PIETRZAK et al. Expression In Plants Of Two Bacterial Antibiotic Resistance Genes After Protoplast Transformation With A New Plant Expression Vector. Nucl. Acids Res. 1986, Vol. 14, No. 14, pages 5857-5868, especially pages 5858, 5859, 5861 and 5862.	15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/20308

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Please See Extra Sheet.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/20308

A. CLASSIFICATION OF SUBJECT MATTER:

IPC (6):

C12N 5/04, 15/29, 15/09, 15/11, 15/63, 15/64, 15/66, 15/67, 15/82; A01H 5/00, 5/10

A. CLASSIFICATION OF SUBJECT MATTER:

US CL :

435/69.1, 320.1, 410, 412, 419, 468; 536/23.6; 800/278, 287, 295, 298, 320.1

BOX II. OBSERVATIONS WHERE UNITY OF INVENTION WAS LACKING

This ISA found multiple inventions as follows:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be searched, the appropriate additional search fees must be paid.

Group I, claims 1-18, drawn to a first product, a DNA construct encoding a delta-zein, linked to a promoter and a 3' untranslated region (UTR) modified to be devoid of dzrl binding sites, and vectors and plants transformed with said DNA construct; and a first method, comprising making high methionine corn with said DNA construct.

Group II, claim(s) 19-21, drawn to a second product, an isolated nucleic acid comprising a 3' UTR of a 10 kDa zein gene, and a chimeric gene comprising any coding sequence operably linked to said UTR.

The inventions listed as Groups I and II do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The modified 3' UTR of the first product in Group I is not shared with the non-modified 3' UTR of the second product in Group II. The non-modified UTR of Group II also is not shared or used by the method of Group I. Further, the sequences of both groups may be obtained by alternative means, such as chemical synthesis.

PATENT COOPERATION TREATY

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REC'D 11 JAN 2001

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

15

Applicant's or agent's file reference RUT 99-0002P	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/US99/20308	International filing date (day/month/year) 25 AUGUST 1999	Priority date (day/month/year) 27 AUGUST 1998
International Patent Classification (IPC) or national classification and IPC Please See Supplemental Sheet.		
Applicant RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 6 sheets.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 0 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of report with regard to novelty, inventive step or industrial applicability
- IV ☒ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 20 MARCH 2000	Date of completion of this report 20 NOVEMBER 2000
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer ASHWIN MEHTA DELLA MAE COLLINS PARALEGAL SPECIALIST TECHNOLOGY CENTER 1600
Facsimile No. (703) 305-3230	Telephone No. (703) 308-0196

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/20308

I. Basis of the report1. With regard to the **elements** of the international application:*

- ☒ the international application as originally filed
- ☒ the description:
pages 1-34 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____
- ☒ the claims:
pages 35-37 , as originally filed
pages NONE , as amended (together with any statement) under Article 19
pages NONE , filed with the demand
pages NONE , filed with the letter of _____
- ☒ the drawings:
pages 1-8 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____
- ☒ the sequence listing part of the description:
pages 1-3 , as originally filed
pages NONE , filed with the demand
pages NONE , filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☒ contained in the international application in printed form.
- ☒ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheets/fig NONE

5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

**Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/20308

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
- ☒ paid additional fees.
- ☐ paid additional fees under protest.
- ☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

- ☐ complied with.
- ☒ not complied with for the following reasons:

Please See Supplemental Sheet.

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

- ☒ all parts.
- ☐ the parts relating to claims Nos. .

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US99/20308

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. statement

Novelty (N)	Claims	<u>1-18 and 20-21</u>	YES
	Claims	<u>19</u>	NO
Inventive Step (IS)	Claims	<u>1-18, 20, and 21</u>	YES
	Claims	<u>19</u>	NO
Industrial Applicability (IA)	Claims	<u>1-21</u>	YES
	Claims	<u>NONE</u>	NO

2. citations and explanations (Rule 70.7)

Claim 19 lacks novelty under PCT Article 33(2) as being anticipated by Kirihera et al.

The claim is broadly drawn towards any isolated nucleic acid comprising the 3' UTR of any 10 kDa zein gene.

Kirihera et al teach the nucleotide sequence of the 10 kDa zein gene from maize. Sequences found within the untranslated region in the 3' terminus are shown (page 362).

Claim 19 lacks an inventive step under PCT Article 33(3) as being obvious over Kirihera et al.

Kirihera et al is described above. The claims lack an inventive step as the reference describes a product that is encompassed by the claims.

Claims 1-18, 20, and 21 meet the criteria set out in PCT Article 33(2) and (3), because the prior art does not teach or fairly suggest a DNA construct comprising the coding sequences of a delta-zein operably linked to a 3' UTR that has been modified to no longer contain binding sites for the dzr1 negative regulatory protein. The prior art also does not teach SEQ ID NO: 1.

Claims 1-21 meet the criteria set out in PCT Article 33(4), in that they have the industrial applicability in being useful for increasing the methionine content of edible portions of important food crops.

----- NEW CITATIONS -----

NONE

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The description is objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 5 because it fails to contain an adequate written description of all isolated nucleic acids comprising a 3' UTR of all 10 kDa zein genes. The description is inadequate because: the only 3' UTR of a 10 kDa zein gene described by the description is that within the sequence listing. Other such isolated sequences are not described, and therefore not reduced to practice. A description of a nucleic acid required more than just an explanation of a method of how one would obtain it. What is required is a description of the DNA itself.

Claim 19 is objected to as lacking clarity under PCT Rule 66.2(a)(v) because practice of the claimed invention is not adequately described in writing, as required under PCT Rule 5.1(a)(iii), for the reasons set forth in the immediately preceding paragraph.

Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

CLASSIFICATION:

The International Patent Classification (IPC) and/or the National classification are as listed below:

IPC(7): C12N 5/04, 15/29, 15/09, 15/11, 15/63, 15/64, 15/66, 15/67, 15/82; AO1H 5/00, 5/10 and US Cl.: 435/69.1, 320.1, 410, 412, 419, 468; 536/23.6; 800/278, 287, 295, 298, 320.1

IV. LACK OF UNITY OF INVENTION:

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2, and 13.3 is not complied with for the following reasons:

As applicant was previously notified this International Preliminary Examining Authority has found plural inventions claimed in the International Application covered by the claims indicated below:

This application contains the following inventions or groups of inventions which are not so linked as to form a single inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-18, drawn to a first product, a DNA construct encoding a delta-zein, linked to a promoter and a 3' untranslated region (UTR) modified to be devoid of dzr1 binding sites, and vectors and plants transformed with said DNA construct; and a first method, comprising making high methionine corn with said DNA construct.

Group II, claim(s) 19-21, drawn to a second product, an isolated nucleic acid comprising a 3' UTR of a 10 kDa zein gene, and a chimeric gene comprising any coding sequence operably linked to said UTR.

and it considers that the International Application does not comply with the requirements of unity of invention (Rules 13.1, 13.2 and 13.3) for the reasons indicated below:

The inventions listed as Groups I and II do not relate to a single inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the modified 3' UTR of the first product in Group I is not shared with the non-modified 3' UTR of the second product in Group II. The non-modified UTR of Group II also is not shared or used by the method of Group I. Further, the sequences of both groups may be obtained by alternative means, such as chemical synthesis.